No. 2.

BRITISH MUSEUM (NATURAL HISTORY).

REPORT ON CETACEA

STRANDED ON THE BRITISH COASTS DURING 1914

(WITH ONE TEXT-FIGURE AND THREE MAPS).

BY

S. F. HARMER, Sc.D., F.R.S.,

Keeper of the Department of Zoology.

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PREFACE.

THE arrangements made by the Board of Trade for communicating information relating to stranded whales were continued during 1914 with increasing thoroughness. While in 1913 only 7 records were received up to the end of July, the number during the same period in 1914 amounted to 43; including, however, 3 received from other sources. The outbreak of war at the beginning of August gave other occupations to Coastguard officers, and during the whole of that month no new records were obtained. A small number of stranded Cetacea were reported during the last four months of the year; but the period from August to the middle of October, which provided far the largest number of records during 1913, was greatly affected by the abnormal conditions of 1914, as is shown by the following figures:—

	August.	September.	October 1–15.
1913	15	18	21
1914	0	5	0

In spite of this deficiency at a specially important period, the year 1914 closed with a total of 57 records, as compared with 76 in 1913.

Although the number reported during 1914 has shown a falling off, the evidence obtained with regard to the species stranded is much more precise than in the preceding year. This has been due to the policy which was adopted near the beginning of the year of making efforts to obtain the lower jaw, in the case of the smaller Cetacea, or a blade of baleen in the case of the Whalebone Whales. This method of investigation has proved very satisfactory in practice. The parts indicated can be removed without difficulty and can be sent by post at small expense. They are as a rule amply sufficient for the determination of the species; and in this way, aided in some cases by photographs and excellent sketches, a considerable proportion of the specimens have been determined. The thanks of the Trustees are due to the Coastguard officers and Receivers of Wreck who have given such valuable assistance in this enquiry; and also to others who have independently contributed records of stranded Cetacea. Among these I wish to mention specially Mr. W. Taylor, who sent information relating to the specimens numbered 17A and 20A; Mr. T. Sheppard for the record No. 24; Mr. W. H. Barrett for No. 30A; and Mr. Albert Wade, who put me in communication with Mr. Barrett. I am particularly indebted to Vice-inspector H. Winge, of the Copenhagen Museum, as well as to Dr. Knud Andersen, for information with regard to the teeth of the Common Porpoise.

Out of the total number of specimens recorded, 34 may be considered to have been definitely determined, while there are only 14 which are left entirely uncertain.

SIDNEY F. HARMER,
Keeper of Zoology.

BRITISH MUSEUM (NATURAL HISTORY),
LONDON, S.W.
February, 1915.

REPORT ON CETACEA STRANDED ON THE BRITISH COASTS DURING 1914.

(1) Number of Specimens of Cetacea Stranded.

The number of Whales, Dolphins, etc., reported during 1914 was 57. During May three Sharks were wrongly reported as Whales. One of these, from Caister-on-Sea (Norfolk), proved to be a Porbeagle (*Lamna cornubica*), while the other two, from Galley Head and Ballycrovane, both in Co. Cork, were large Basking Sharks (*Cetorhinus maximus*). The specimens included in the subjoined list were probably all Cetacea.

(2) Dates.

As in the previous year, the dates are not necessarily those on which the animals died. Some of the Whales reported were alive when stranded, while others were found in a more or less advanced state of decomposition.

(3) Determination of the Species.

The methods adopted have been explained in the Preface. In addition to the evidence obtained from lower jaws and blades of whalebone, the sketches made by some of the Coastguard officers have proved very valuable, and have in several cases been so good that complete confidence could be felt in the determinations made from them.

(4) List of the Cetacea reported as having been Stranded on the British Coasts during 1914.

No.	Date.	Locality.	County.	Length.	Species.	Notes.
				ft. in.		
1	Jan. 13	Kingsdown	Kent	3 8	*Phocaena phocaena* (?)	1
2	,, 19	Pevensey	Sussex	5 4	"Porpoise"	
3	,, 22	Sutton-on-Sea	Lincolnshire	3 6	*Phocaena phocaena* (?)	3
4	Feb. 4	Polperro	Cornwall	6 0	"Porpoise"	
5	,, 9	Bannow	Wexford	6 0	*Delphinus delphis* (?)	5
6	,, 12	Newhaven	Sussex	4 6	*Phocaena phocaena* (?)	6
7	,, 13	Barrow-in-Furness	Lancashire	4 2	"Porpoise"	
8	,, 18	Carnsore	Wexford	4 9	*Delphinus delphis*	J.
9	,, 22	Bournemouth	Hampshire	8–9 0	"Porpoise"	
10	,, 28	Derrynane	Kerry	60 0	*Balaenoptera borealis*	B. 10
11	Mar. 2	Beer Head	Devon	20 0	*Balaenoptera*, sp. (*juv.*)	11

No.	Date.	Locality.	County.	Length.	Species.	Notes.
				ft. in.		
12	Mar. 3	Brunton Burn .	Northumberland	11 0	*Globicephala melaena* .	J.
13	,, 11	Blyth	,,	28 0	*Hyperoodon rostratus*, ♂ .	13
14	,, 27	Skerries . . .	Dublin . . .	3 0	*Phocaena phocaena* . .	J.
15	,, 29	Farrihy Bay . .	Clare . . .	5 0+*	"Porpoise"	
16	Apr. 1	Caister-on-Sea .	Norfolk . . .	4 0	"Porpoise"	
17	,, 4	Newhaven . .	Sussex . . .	6 0	"Porpoise"	
17A	,, 12	Inverness . . .	Inverness . .	5 9	*Delphinus delphis*, ♀ .	17A
18	,, 21	Great Wakering .	Essex . . .	5 6	*Phocaena phocaena* . .	J.
19	,, 27	Mablethorpe . .	Lincolnshire .	5 0	,, ,, . .	J.
20	May 1	Leysdown . . .	Kent . . .	5 0	,, ,, . .	J.
20A	,, 1	Nairn, W. of . .	Nairn . . .	26 0	*Hyperoodon rostratus*, ♂ .	20A
21	,, 2	Palling . . .	Norfolk . . .	4 9	*Phocaena phocaena* . .	J.
22	June 7	,, . . .	,, . . .	2 11	,, ,, (*juv.*)	J.
23	,, 11	Crossconnell . .	Donegal . .	2 11	"Porpoise"	
24	,, 11	Redcar . . .	Yorkshire . .	7 7	*Lagenorhynchus albirostris*	24
24A	,, 13	Portland . . .	Dorset . . .	5–6 0	*Phocaena phocaena* (?) .	24A
25	,, 14	Sandwich . . .	Kent . . .	4 9	*Phocaena phocaena* .	J.
26	,, 15	Deal	,, . . .	5 0	,, ,, .	J.
27	,, 16	Happisburgh . .	Norfolk . . .	3 0	"Porpoise"	
28	,, 20	Bournemouth . .	Hampshire . .	10 0	"Porpoise"	
29	,, 22	Port Erroll . .	Aberdeen . .	8 2	*Lagenorhynchus albirostris*	J.
30	July 3	Skegness . . .	Lincolnshire .	3 6+*	*Phocaena phocaena* . .	J.
30A	,, (?)	Newhaven . .	Sussex . . .	15 0	*Tursiops truncatus* . .	30A
31	,, 11	Skegness . . .	Lincolnshire .	3 6	*Phocaena phocaena* . .	J.
32	,, 12	Waxham . . .	Norfolk . . .	3 0	,, ,, (?) .	32
33	,, 13	Wick	Caithness . .	4 0	*Lagenorhynchus albirostris* (*juv.*).	E.
34	,, 17	Middleton . . .	Sussex . . .	4 5	*Tursiops truncatus* . .	H.
37	,, 22	Blyth	Northumberland	5 0	"Porpoise"	
35	,, 24	Ringsend . . .	Dublin . . .	5 10	*Phocaena phocaena* . .	J.
36	,, 24	Sutton-on-Sea . .	Lincolnshire .	5 0	"Porpoise"	
38	,, 25	Skegness . . .	,, .	3 0	*Phocaena phocaena* . .	J.
39	,, 26	Dovercourt . .	Essex . . .	10 3	*Tursiops truncatus* (?) .	39
40	Sept. 4	Amble	Northumberland	8 0	*Lagenorhynch. albirostris* (?)	40
41	,, 5	Terrington . .	Norfolk . . .	26 2	*Hyperoodon rostratus*, ♀ .	41
42	,, 15	Mersehead . .	Kirkcudbright .	18 6	,, ,, ♂ .	J. 42
43	,, 21	Rosslare . . .	Wexford . .	11 10	*Mesoplodon bidens*, ♀ .	E. 43
44	,, 21	Crosskirk . . .	Caithness . .	43 0	*Balaenoptera borealis* .	B.
45	Oct. 18	Birchington . .	Kent . . .	61 5	,, *physalus*, ♀	45
46	,, 19	Dungeness . .	,, . . .	5 4	*Phocaena phocaena* . .	J.
47	,, 30	Caister-on-Sea .	Norfolk . . .	4 0+†	"Porpoise"	
48	,, 31	Happisburgh . .	,, . . .	3 6+	"Porpoise"	
49	Nov. 17	John o' Groats .	Caithness . .	47 0	*Balaenoptera borealis* .	B. 49
50	,, 23	Blue Anchor . .	Somerset . .	22 0	*Hyperoodon rostratus*, ♂ .	50
51	,, 25	Lydd	Kent . . .	3 2	*Phocaena phocaena* . .	J.
52	Dec. 4	Johnshaven . .	Kincardine . .	5 9	*Delphinus delphis* . .	J.
53	,, 14	Pevensey . . .	Sussex . . .	5 6	*Phocaena phocaena* . .	J.

* Tail missing. † Head missing.

The following notes refer to the last column of the above table :—

B *signifies* blade of baleen received.
E ,, entire animal ,,
H ,, head ,,
J ,, lower jaw ,,

No. 1. Teeth stated to be 48 in each jaw (presumably about 24 on each side).
,, 3. Teeth stated to be 18 on each side of each jaw, and somewhat compressed. The length indicates that the specimen was not fully adult.
,, 5. ,, ,, ,, 41 in each jaw. The "snout" was long.
,, 6. ,, ,, ,, 22 on each side of the upper jaw, and 21 on each side of the lower jaw.
,, 10. Determined from a blade of baleen. The length (about 60 feet) recorded is probably too great.
,, 11. Fragments of the head were received, showing that the throat had longitudinal furrows. The bone was immature.
,, 13. Determined from a characteristic sketch sent by Mr. W. Meffen, H.M. Coastguard, Blyth Haven.
,, 17A. Examined on the shore and determined by Mr. W. Taylor.
,, 20A. ,, ,, ,, ,, ,, ,,
,, 24. Record, with photograph, sent by Mr. T. Sheppard. The specimen was determined by Mr. T. H. Nelson, M.B.O.U., who states in *The Naturalist*, No. 690, July 1914, p. 231, that it was secured for the Middlesbrough Museum.
,, 24A. Teeth stated to be about 24 in each jaw.
,, 30A. Recorded in *The Fishing Gazette*, Sept. 5, 1914, by Mr. Walter H. Barrett, who subsequently sent photographs from which the determination was made. The photographs are believed to have been taken on July 12, but the specimen is said to have been stranded some considerable time before that date. The length recorded (15′ 0″) did not profess to be an accurate measurement.
,, 32. Stated to be a Common Porpoise by Mr. T. Erridge (H.M. Coastguard, Palling), who had recently sent two specimens (21, 22) of that species.
,, 39. The measurements sent, and particularly that of the snout (4″), indicate that this was a Bottle-nosed Dolphin.
,, 40. Teeth stated to be $\frac{26}{26}$, about $\frac{3}{4}''$ long and $\frac{3}{16}$–$\frac{1}{4}''$ in diameter.
,, 41. Determined from a photograph sent by the Receiver of Wreck, King's Lynn, by whom it was reported as a Bottle-nosed Whale.
,, 42. An excellent sketch was forwarded by the Deputy Receiver of Wreck, Dumfries, who reported it as a Bottle-nosed Whale, and discovered the two teeth concealed beneath the gum at the front end of the lower jaw.
,, 43. Determined in the first instance from a sketch submitted by Mr. John Scott, H.M. Coastguard, Rosslare, in reporting the specimen. Mr. Scott subsequently sent an excellent photograph of the animal, and rendered valuable assistance in securing this interesting specimen.
,, 45. Determined by Mr. W. P. Pycraft, who examined the specimen on the shore.
,, 49. Two photographs of the entire animal were sent by Mr. G. W. Peterkin, Deputy Receiver of Wreck, Wick.
,, 50. Determined from an excellent sketch sent by Mr. Langham, H.M. Customs, Minehead.

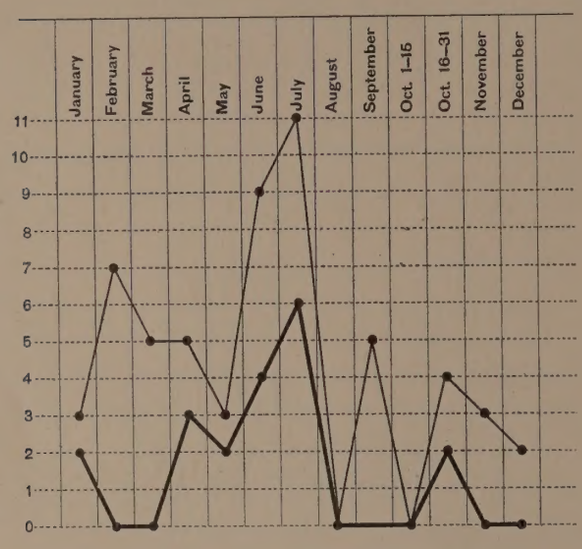
(5) Frequency of the occurrence of stranded Cetacea during different Months of 1914.

The frequency of the records at different times in the year is represented by the curves on p. 8. These correspond in their construction with those published in the previous Report, the upper curve giving the number of records for the entire coast-line, and the lower curve the number of specimens of which the total length did not exceed five and a half feet, stranded on the East coast of England, as far south as the Straits of Dover, during the entire year. Of those indicated in the lower curve, 10 are known to have been Common Porpoises, 3 probably belonged to the same species, while 6 could not be determined. For the reason explained in the Preface, the

record can be regarded as normal only for the first seven months of the year. As compared with 1913 it indicates that the number of the smaller Cetacea began to increase in June instead of in August. It agrees with the 1913 curve in showing a smaller number of Porpoises during the winter, spring and autumn than during the summer.

(6) Distribution on the Coast-Lines.

As in 1913, most of the records belong to the North Sea and the Eastern half of the English Channel. The counties with the largest number of stranded Cetacea during 1914 are Lincolnshire (6), Norfolk (8), Kent (7), and Sussex (6). Only three records were received from the entire Western coast of Great Britain, namely, a Bottle-nosed Whale from the Solway Firth, a "Porpoise" from Lancashire, and a Bottle-nosed Whale from Somerset.



Common Porpoise (*Phocaena phocaena*).

The records indicate that this is far the commonest species on the English coasts. Fifteen specimens were definitely determined, while there was some reason for believing that five others belonged to this species. Ten of the small Cetacea, about which no sufficient evidence was obtained, may also have been Common Porpoises.

Most of the specimens were recorded from the part of the coast extending from Lincolnshire to Sussex; and in this district they occurred during a considerable portion of the year. There was less evidence of a southerly migration, as the year advanced, than in 1913; but along this part of the coast-line no Porpoises were reported further north than Kent during the winter months, January, February, November and December, with the exception of a specimen from Lincolnshire on January 22. It is noteworthy that not a single *P. phocaena* was recorded from Scotland during the whole of 1914; while in 1913 there was only one specimen of this species, from Fair Island. Two Common Porpoises were reported from Co. Dublin, in March and July respectively. Of the other Irish records, 15 and 23 may have belonged to the same species, although no evidence on the subject was obtainable. A Lancashire specimen (February) may also have been a Common Porpoise.

In the following table the specimens are arranged according to their species :—

No.	Date.	County.	Length.	Evidence of Determination.
Species uncertain—			ft. in.	
2	Jan. 19	Sussex . .	5 4	
4	Feb. 4	Cornwall .	6 0	
7	„ 13	Lancashire .	4 2	
9	„ 22	Hampshire .	8–9 0	
15	Mar. 29	Clare . .	5 0	
16	Apr. 1	Norfolk . .	4 0	
17	„ 4	Sussex . .	6 0	
23	June 11	Donegal .	2 11	
27	„ 16	Norfolk . .	3 0	
28	„ 20	Hampshire .	10 0	
37	July 22	Northumberland	5 0	
36	„ 24	Lincolnshire .	5 0	
47	Oct. 30	Norfolk . .	4 0	
48	„ 31	„ . .	3 6	
Phocaena phocaena—				
1	Jan. 13	Kent . .	3 8	sp. ?
3	„ 22	Lincolnshire .	3 6	sp. ?
6	Feb. 12	Sussex . .	4 6	sp. ?
14	Mar. 27	Dublin . .	3 0	L. jaw
18	Apr. 21	Essex . .	5 6	L. jaw
19	„ 27	Lincolnshire .	5 0	L. jaw
20	May 1	Kent . .	5 0	L. jaw
21	„ 2	Norfolk . .	4 9	L. jaw
22	June 7	„ . .	2 11	L. jaw
24A	„ 13	Dorset . .	5–6 0	sp. ?
25	„ 14	Kent . .	4 9	L. jaw
26	„ 15	„ . .	5 0	L. jaw
30	July 3	Lincolnshire .	3 6	L. jaw
31	„ 11	„ .	3 6	L. jaw
32	„ 12	Norfolk . .	3 0	sp. ?
35	„ 24	Dublin . .	5 10	L. jaw
38	„ 25	Lincolnshire .	3 0	L. jaw
46	Oct. 19	Kent . .	5 4	L. jaw
51	Nov. 25	„ . .	3 2	L. jaw
53	Dec. 14	Sussex . .	5 6	L. jaw
Delphinus delphis—				
5	Feb. 9	Wexford .	6 0	sp. ?
8	„ 18	„ .	4 9	L. jaw
17A	Apr. 12	Inverness .	5 9	[Mr. W. Taylor]
52	Dec. 4	Kincardine .	5 9	L. jaw
Lagenorhynchus albirostris—			ft. in.	
24	June 11	Yorkshire .	7 7	[Mr. T. Sheppard]
29	„ 22	Aberdeen .	8 2	L. jaw
33	July 13	Caithness .	4 0	Entire
40	Sept. 4	Northumberland	8 0	sp. ?
Tursiops truncatus—				
30A	July ?	Sussex . .	15 0	Photographs
34	„ 17	„ . .	4 5	Head
39	„ 26	Essex . .	10 3	sp. ?
Globicephala melaena—				
12	Mar. 3	Northumberland	11 0	L. jaw
Hyperoodon rostratus—				
13	Mar. 11	Northumberland	28 0	Sketch
20A	May 1	Nairn . .	26 0	[Mr. W. Taylor]
41	Sept. 5	Norfolk . .	26 2	Photograph
42	„ 15	Kirkcudbright	18 6	L. jaw, sketch
50	Nov. 23	Somerset .	22 0	Sketch
Mesoplodon bidens—				
43	Sept. 21	Wexford .	11 10	Entire
Balaenoptera physalus—				
45	Oct. 18	Kent . .	61 5	[Mr. W. P. Pycraft]
Balaenoptera borealis—				
10	Feb. 28	Kerry . .	60 0	Baleen
44	Sept. 21	Caithness .	43 0	Baleen
49	Nov. 17	„ .	47 0	Baleen
Balaenoptera sp.				
11	Mar. 2	Devon . .	20 0	Parts of head

Common Dolphin (*Delphinus delphis*).

Four records of this species were obtained, one of them being probable, but not quite certain. All were found in the winter or spring, two being reported from Wexford in February, one from Inverness in April, and one from Kincardine in December. The specimen reported from Cornwall in February, and that from Sussex in April, may have belonged to this species.

White-beaked Dolphin (*Lagenorhynchus albirostris*).

Four specimens, the determination of one being uncertain. A young individual was obtained from Caithness on July 13; and adult specimens were recorded from Yorkshire and Aberdeen on June 11 and 22, and from Northumberland on September 4. The individuals of this species were thus all found during the summer, on the East coast of the Northern half of Great Britain.

Bottle-nosed Dolphin (*Tursiops truncatus*).

The three specimens recorded were all found during July, one of them on the Essex coast and the other two in Sussex. Of these, No. 34 was quite young, only one or two of the teeth having pierced the gum. It can hardly have been the calf of No. 30A, which appears to have been stranded early in July, if not in June; but it may have belonged to a school which included No. 30A.

Pilot Whale (*Globicephala melaena*).

A single individual was recorded on the Northumberland coast on March 3.

Bottle-nosed Whale (*Hyperoodon rostratus*).

This species occurred, from March 11 to November 23, in various localities, three on the East coast of Great Britain, and two on the West coast. The Northumberland specimen was found on an exposed part of the coast, but the others, respectively from the Moray Firth, the Wash, the Solway Firth, and the Bristol Channel, were stranded in inlets of the sea, up the coast of which they had wandered. The shape of the head shown in the photograph received indicates that the Norfolk specimen was a female. The other four were males, the sex having been recorded by Mr. W. Taylor in the case of the Nairn specimen, and being inferred from the greatly dilated forehead shown in the sketches of the other three.

Sowerby's Whale (*Mesoplodon bidens*).

The specimen of this species stranded alive on the coast of Co. Wexford, on September 21, is the most interesting record of the year. Thanks to a sketch made by Mr. John Scott, the species was fortunately recognised soon enough to enable the entire specimen to be secured for the Museum. The animal proved to be a female; and, as appears to be usual in this sex, no teeth could be seen in the mouth before the removal of the gum. The alimentary canal was entirely empty.

Common Rorqual (*Balaenoptera physalus*).

A female individual, 61 feet 5 inches long, was stranded at Birchington, on the Northern coast of Kent, on October 18. It may be presumed that it was on its southerly migration.

Rudolphi's Rorqual (*Balaenoptera borealis*).

The Kerry specimen stranded on February 28 was probably migrating northwards. The baleen of this species is characterised by possessing white hairs which are finer than those of other species. The receipt of a blade of baleen proved that the specimen really belonged to this species, and it may accordingly be surmised that the length recorded (60 feet) was not correctly measured, since individuals of this species are not known to reach so great a length.

The other two specimens were stranded on the extreme Northern coast of Scotland, on September 21 and November 17 respectively. They were, no doubt, on their return journey southwards.

On March 2 a very immature Rorqual was stranded on the South coast of Devonshire. It was not possible to determine the species, but it may, perhaps, have been the calf of the Kerry Rudolphi's Whale, the sex of which was, however, not recorded. The old and the young specimens were stranded within two days of one another, and both are described as having been decomposed. If death took place at some distance from land, one individual might have been floated to the Kerry Coast and the other to that of South Devon. Lieut. B. Phibbs, R.N., who examined the young specimen on the shore, has been kind enough to inform me that from his knowledge of the currents he considers it perfectly possible for this to have happened.

(7) The Teeth and Rate of Growth of the Common Porpoise (*Phocaena phocaena*).

The following notes on the teeth of the Common Porpoise are based on the examination of fifteen lower jaws, more or less complete, which were obtained during 1914:—

(i) The number of teeth visible during life is seldom, if ever, the actual number present.

Nearly all the jaws were received in the flesh, and the number of visible teeth was counted before they were cleaned. The alveolar surface of the cleaned jaw is seen to bend ventrally over the symphysis at the anterior end of the tooth-series. In this region is found at least one pair of vestigial teeth, which do not cut the gum, and are smaller than those that follow. In nearly all cases two pairs of these small teeth are present, of which the front pair may be directed straight forwards.

(ii) The number of teeth is variable, and is commonly different on the two sides.

The number on each side visible during life is most commonly 23, and the real number is 25. It varies about this mean from 20 (22) to 26 (28). In the specimen No. 25 two teeth on the right side and one on the left side have two roots each. This condition may be regarded as due either to concrescence of two

teeth or to splitting of the root of a single tooth. Counting each of these double teeth as two, there are in this specimen 28 teeth on the right side and 27 on the left side; and this was the highest number found in any specimen. The numbers visible during life were 26 and 25 respectively.

If the number is unequal on the two sides, the difference is usually either one or two.

(iii) While some of the differences observed are due to the amount of wear (see the next paragraph), there is considerable variation in the form of the teeth.

The "spade-shaped crowns" which are so characteristic of the Porpoise may have their most prominent point at the centre of the tooth (as in the figure on p. 263 of Flower and Lydekker's "Introduction to the Study of Mammals," 1891); or the free surface of the crown may be truncate, and distinctly emarginate in the middle. There is a certain amount of variation in the antero-posterior and transverse diameters of the roots, some of which are distinctly broader or thicker than others. There is unfortunately no evidence with regard to the sex of the specimens; but it might be worth while to ascertain whether any of the differences noticed in the teeth depend on the sex of the animal.* No. 46 is a very peculiar specimen, some of the crowns being extremely short in an antero-posterior direction. One of them is almost spike-like, and is very different, at first sight, from the crown of a typical Porpoise's tooth. It would be natural to suppose that the shortness of the crowns was due to wear, but this does not appear to be the case. The roots are rather massive.

(iv) The appearance of the teeth depends on their age and on the extent to which they are worn.

A complete series of teeth, all with typical spade-like crowns, can only be seen in relatively young specimens, as in those numbered respectively 22, 31, 19, 30, 21. If not too old (22, 31, 19), the crowns of some of the teeth have an oblique position, and overlap one another to a greater or less extent. A nodal point is commonly visible on each side, represented by a single tooth, the long axis of the crown of which stands in the line of the jaw. The obliquity of the crowns is in one direction in front of this point, and in the reversed direction behind it. The nodal point may occur near either end of the tooth-series; and the disposition indicated is no doubt the result of the fact that the teeth are at first packed into a space which is not long enough to permit them to stand in line.

In older jaws the length of the tooth-series is found to have increased, and the teeth, which have thus more room, stand in line, the previous obliquity being lost. The crowns may become worn off as growth proceeds, the process beginning at the

* Hr. H. Winge informs me (*in litt.*) that he has been unable to obtain any evidence of differences between male and female Porpoises in respect of their teeth.

front end of the series. In No. 20 the crowns of all the teeth are completely worn away, except at the posterior end of the series, where one or two teeth still show the characteristic spade-like form.

(v) Evidence derived from the teeth as to the age of the specimen.

The number of jaws available is insufficient to give a clear answer to this question; but it seems obvious that some information might be obtained from the comparison of a sufficient number of specimens the dates of capture of which are known.

On arranging the Porpoises according to their total lengths, as recorded by the Coast-guard officers, it was found that the sequence was different from that obtained by arranging the lower jaws in order of length. It thus seemed advisable to neglect the recorded total lengths, many of which probably depended on measurements taken with no attempt at real accuracy, or even on rough estimates made without measurement. The following is the result of arranging the lower jaws in order of length :—

No.	Date.	Recorded length of animal.	Length of lower jaw.	Actual number of teeth.		Remarks on teeth.
				R.	L.	
		ft. in.	mm.			
38	July 25	3 0	?	?	?	Completely below the gum.
22	June 7	2 11	139	?	?	Not cut, oblique and overlapping.
31	July 11	3 6	171	26	28	Quite unworn, oblique and overlapping.
19	Apr. 27	5 0	181	24	24	,, ,, ,, ,, ,,
20	May 1	5 0	183	23	22	Much worn, all traces of crowns lost except at posterior end of series. Roots unusually thick.
30	July 3	3 6+*	183	24	25	Unworn, some obliquity still present.
21	May 2	4 9	186	25	24	,, crowns emarginate, roots broad.
53	Dec. 14	5 6	195	?	?	Much injured and mostly lost; those present unworn.
18	Apr. 21	5 6	197	24	25	Beginning to be worn, roots narrow.
26	June 15	5 0	197	25	28	Partially worn, roots broad. [11.)
25	,, 14	4 9	196+(200)	28	27	A good deal worn, roots narrow; 3 double teeth (see p.
46	Oct. 19	5 4	210+	23	22	Not much worn, roots rather massive, crowns very small.
35	July 24	5 10	218	?	?	In rotten condition.

* Tail missing.

The specimens included in the above table are all from the English coast, from Mablethorpe in Lincolnshire to Pevensey in Sussex, with the exception of No. 35, which was stranded in Co. Dublin. No. 46 was stranded in October, and No. 53 in December. The remainder all belong to the four months April to July. If any two specimens (other than 46 and 53) were born in successive years they must have differed in age by eight or nine months, assuming that the Porpoise has a more or less definite breeding season; and this considerable interval ought to make it possible to obtain some information with regard to the ages of the specimens.

There seems to be a general agreement that birth takes place, in the majority of

cases, about midsummer. Jenyns * records a specimen found in May which contained a fully formed foetus, and adds, "it is probable, therefore, that they produce their young at about that period of the year." Detailed information on the rate of growth of the foetus is given by Guldberg and Nansen,† according to whom development begins about August, the period of gestation lasts about ten months, or possibly longer, while birth takes place in June, before or after midsummer. A foetus 7 mm. long was found on August 31, and a number of other cases are given, showing that the length increases fairly regularly till the following summer. Collett‡ states that the young is usually born in June, sometimes earlier (May), and sometimes later (beginning of July). The young at birth may be as much as 860 mm. (= 2 feet 10 inches) long. The youngest individual already born was 885 mm. (= 2 feet 11 inches) long. The adult may reach a length of 1·9 metres (= 6 feet 3 inches). Millais§ states that the young at birth is, on the average, 800 mm. (= 2 feet 7½ inches) long.

On May 26, 1914, a female Porpoise is recorded‖ as having been caught off Dungeness. It was transferred to the Brighton Aquarium, where, on May 31, it gave birth to a male which measured 2 feet 2 inches in length. It is not unlikely, under the circumstances, that birth was in this case somewhat premature.

The conclusions drawn from the sizes of the jaws and the condition of the teeth in the specimens here recorded agree well with these statements.

It may fairly be assumed that, of the stranded Porpoises, No. 22 and No. 38 were born in 1914, since their teeth were not cut and they were presumably sucklings. These specimens were obtained respectively on June 7 and July 25; their total length was about 3 feet; and the jaw-length of No. 22 was 139 mm.

No. 31, reported as 3 feet 6 inches in length, was obtained on July 11. Its teeth are unworn, although they have been cut. Its lower jaw is 171 mm. long; and this so much exceeds that of No. 22 that it seems hardly possible to refer its birth to the same year. It may be referred provisionally to 1913.

Of the next four specimens in the table on p. 13, No. 20 is in several respects very peculiar, and it must be considered separately. The other three, 19, 30 and 21, agree closely in their jaw-length, which measures from 181 to 186 mm. These specimens have unworn teeth, and may have belonged to 1912.

The next four specimens, 53, 18, 26, 25, also form a homogeneous group, with a jaw-length of 195 to 200 mm., and (except in 53) with indications of wear in their teeth. They may have been born in 1911.

The last two specimens, 46 and 35, have jaws not less than 212 mm. long (No.

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* Jenyns, L., 1835, "Man. Brit. Vert. Animals," p. 42.

† Guldberg, G., and Nansen, F., 1894, "On the Development and Structure of the Whale," Part I, "On the Development of the Dolphin," *Bergens Museums Skrifter*, Bd. V, p. 65.

‡ Collett, R., 1912, "Norges Pattedyr," 15 and 16 Hefte, p. 721.

§ Millais, J. G., 1906, "The Mammals of Great Britain and Ireland," Vol. III, p. 322.

‖ James, L. H., *Proc. Zool. Soc.* 1914, p. 1061.

46 is incomplete). They are probably at least a year older than those of the preceding group. No. 35 had the greatest total length recorded, and its jaw was the longest obtained. The teeth were in a very rotten state, and most of them were broken off. Eight or nine uninjured teeth on each side, at the anterior end of the jaw, are in the peculiar condition of those of No. 46 mentioned on p. 12. Although there is not much evidence of wear of the crowns, it seems probable that this animal had almost reached the limit of its existence.

The comparison of the lower jaws obtained thus seems to indicate that not less than four years are represented; and that if the principal breaks in the series have any significance, the life of a Porpoise is not less than four years.

The jaw No. 20 is in several respects a very peculiar one. At the posterior end one or two teeth still retain enough of the crown to show that this part has the form characteristic of *Phocaena*. But with these exceptions the crowns are completely worn away, leaving merely the roots. These are separated from one another by intervals which are shorter than usual, and they are specially massive and cylindrical, suggesting, in a miniature form, the teeth of a Sperm Whale.

The jaw is remarkable for being much smaller than would be expected from the great amount of wear which has taken place in its teeth. It measures only 183 mm. in length, or hardly more than that of No. 19, which has the oblique, overlapping teeth noticed in obviously young individuals. The lower border of the jaw is, moreover, straighter than usual, the majority of specimens having this border very concave. It may be noted that No. 46 and No. 35, the two largest jaws obtained, show some approach to No. 20 in having more or less cylindrical roots, though the crowns have not been worn down in the same way.

It is possible that a tooth which at first has a compressed root might with increasing age develop a thicker root. But I found some difficulty in accepting this as an explanation of the peculiarities of the teeth of No. 20 from having noticed that in another specimen the pulp-cavity had closed, while the root still had the strap-like form. Under these circumstances I wrote to Hr. H. Winge, a leading authority on this subject, describing shortly the peculiarities of the jaw in question. I have great pleasure in quoting the opinion which he was kind enough to send me in reply, as follows:—

> "The root of the young tooth is slender. With age the root grows very much bigger, probably adding cementum; and when the crowns have been worn down, and the big roots are protruding, the teeth look more heavy and crowded than in the young animals. The jaw with the massive teeth that you mention is probably that of a very aged individual of rather unusually small size. (We have an aged skull from Greenland, the jaw measuring 191)."

If the root can increase in thickness, late in life, by the addition of cement, a considerable part of the difficulty presented by the specimen No. 20 is removed; and I

am thus inclined to accept Hr. Winge's explanation, particularly as the large jaws 46 and 35 show a similar condition of the roots. But as the peculiarities of No. 20 suggested the possibility that the specimen might belong to a distinct species, I have compared it with the type-specimen (Brit. Mus. 65. 12. 8. 43) of *P. tuberculifera*, described by Gray * from an individual captured at Margate. Gray's specimen is that of a young individual, with a lower jaw only 164 mm. in length, and with unworn teeth, some of which are oblique. I can find no sufficient reason for regarding it as distinct from *P. phocaena*, of which *P. tuberculifera* is generally regarded as a synonym. In view of the great variability of teeth in the Common Porpoise, it would be unsafe to regard No. 20 as more than an extreme case of this variation; but it will be desirable to ascertain whether any of the specimens obtained in the future show any approach to it.

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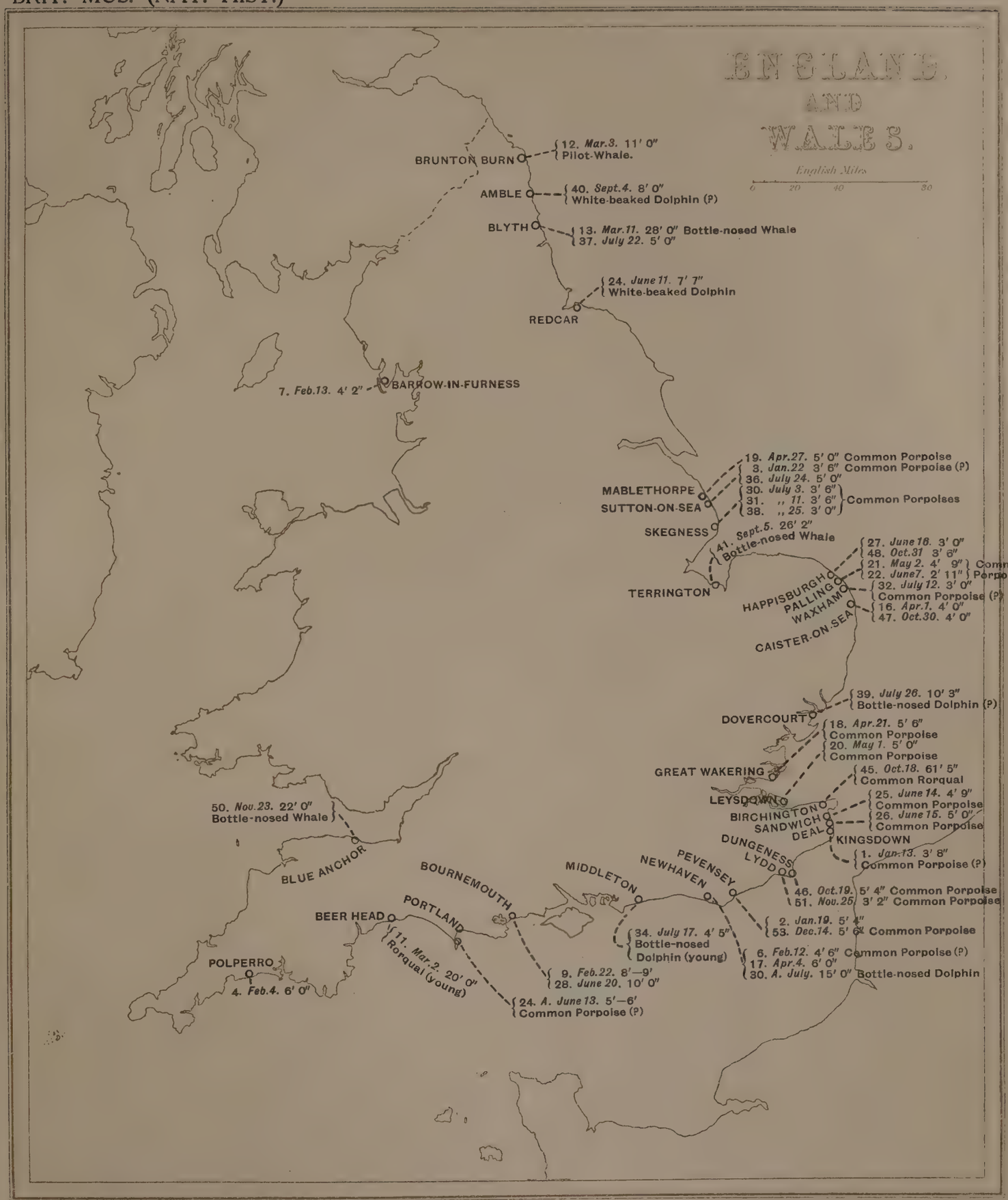
* Gray, J. E., *Proc. Zool. Soc.* 1865, p. 365.

BRIT. MUS. (NAT. HIST.)



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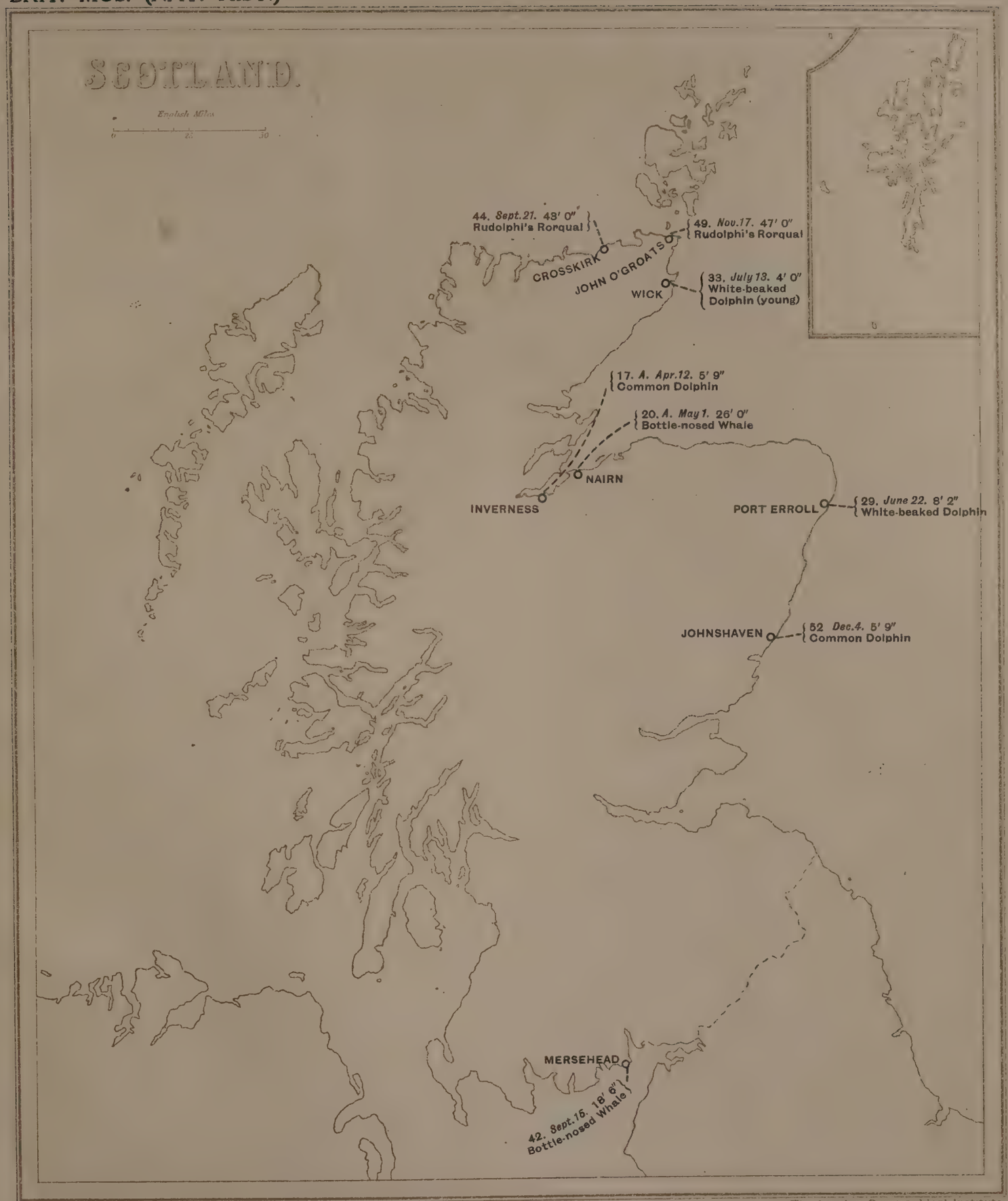

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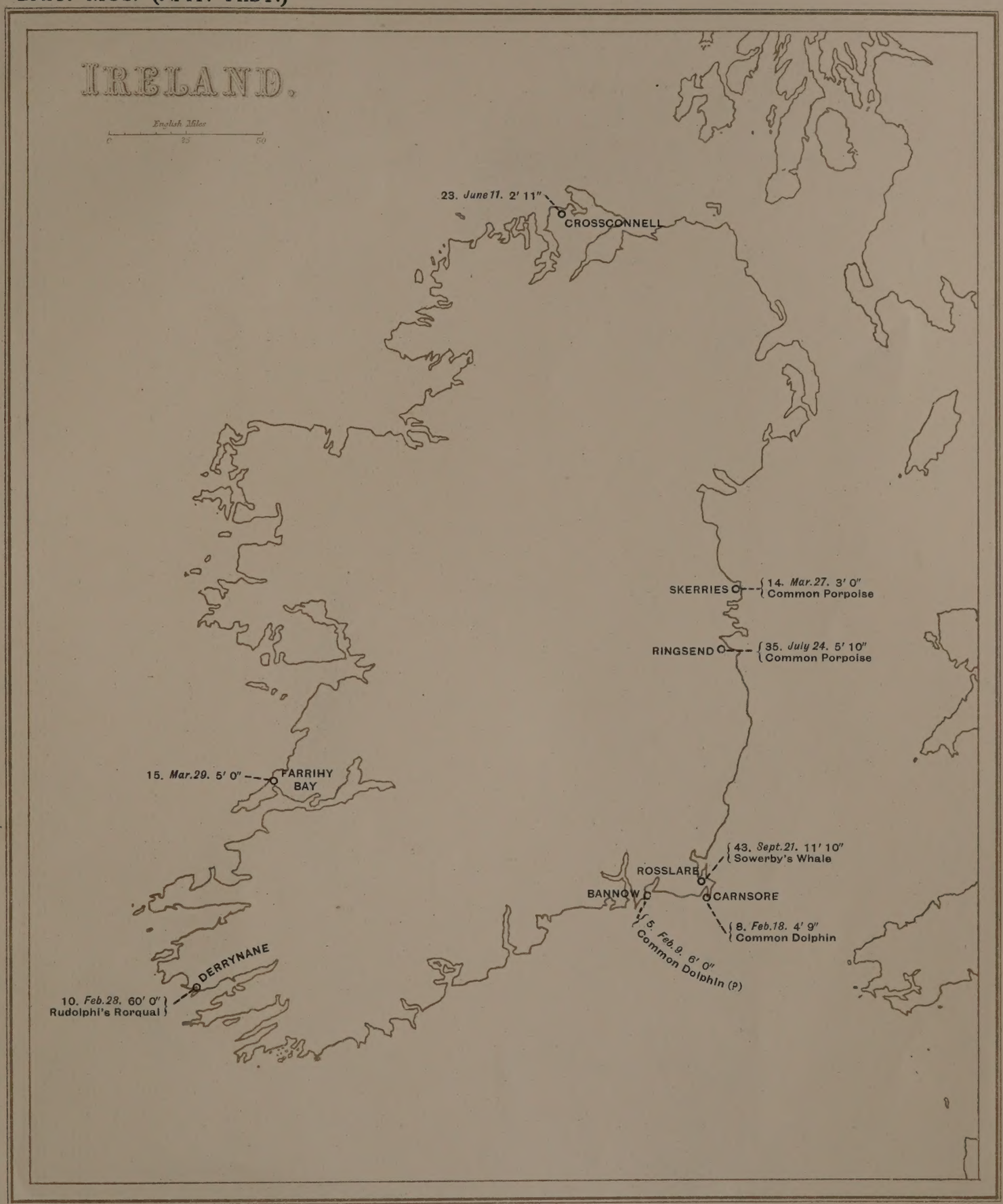

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